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THE JOURNAL OF PHILOSOPHY

THE PARADOX OF JUDGMENT[1]

WHAT is judgment? When the word is used without qualification, does it stand for an act of an individual mind, a sentence having a definite form, an assertion of a state of knowledge, or a description of reality? It does not take much astuteness to observe that judgment is a term covering all these meanings. It may legitimately be employed in any and all of these senses. It enjoys, in other words, a signification at once psychological, logical, epistemological, and metaphysical. Such opulence of meaning is a source of great embarrassment. How harmonize all these significations of judgment? How avoid either suppression or exaggeration? Traditional theories, indeed, tend to ignore some meanings and to magnify others. *Pure* theories—those attempting to define judgment in terms of one set of concepts derived from but one of the four disciplines mentioned—are manifestly gross abstractions. If the aim of a definition is to disclose the *differentia* of that which is to be defined, then a definition of judgment must somehow embrace in one formula a synthesis of psychological, logical, epistemological, and metaphysical considerations.

For the sake of illustrating the necessity for such synthesis, consider any perceptual judgment. "This animal is dangerous," for instance, is an assertion which by a process of abstraction may be regarded as expressing merely the mental act of *judging*. By means of this assertion a particular self affirms a particular belief capable of being evoked by an imaginary animal or by a real animal not actually dangerous. The *act* of judging as an incident in the mental career of a self may be treated in isolation. All the other aspects of judgment may be disregarded when attention is focussed upon those psychological facts or events that lie behind every form of propositional discourse.

By a similar abstraction the assertion may be regarded merely as a logical complex. The existence or non-existence of "this animal" and the reality or unreality of being "dangerous" have nothing to do with the formal nature of the proposition. The logic of judgment is concerned chiefly with the universal *grammar* of the ex-

[1] Read at the meeting of the American Philosophical Association at Chicago, December, 1927.

pressions through which selves convey their attitudes of assent and dissent. The tendency to view propositional discourse abstractly, in independence of the particular minds engaged in judging and of the facts they judge about, is obviously justified if logic is not to be confused with psychology on the one hand, and with epistemology and metaphysics on the other.

By a like abstraction the proposition may be considered as having a sense predominantly epistemological. "This animal is dangerous" may be viewed as a statement disclosing primarily a case of awareness. Since awareness may be of the non-existent or the unreal, as in illusions and dreams, all distinction between judgments simply becomes a distinction in occasions and forms of awareness. If I *see* an animal of terrifying aspect and *believe* it to be dangerous, my judgment is always a true judgment—in so far as it expresses my actual awareness and my actual belief—even if there is neither beast to see nor danger to apprehend. When awareness is singled out as that which judgment principally expresses, judgment is simply a vehicle through which the cognitive relation rises to the level of discourse. To judge is to *report* what one perceives, imagines, remembers, or thinks.

Yet all such ways of viewing judgment are palpably abstract. The three fashions of dealing with the assertion that "this animal is dangerous"—the psychological, the logical, the epistemological—proceed by deliberate suppression of what can not be suppressed, namely, reference to something supposedly real. *Mere* belief, *mere* discourse, *mere* awareness, though analytically separable aspects of judgment, are actually never detached either from one another or from some "existential" situation. Whenever and however I judge, no matter what I judge about, I express simultaneously the quadruple nature of judgment.

Assuming, then, that the *differentia* of judgment is four-fold, that judgment is a belief in propositional dress prompted by some act of awareness in relation to "something" beyond it, what explicitly is this "something" to which judgment is always obliged to refer? This "something" appears to be quite anomalous: It at once lies outside and falls within judgment. It is outside judgment in the sense that belief does not create or discourse constitute it; and it falls within it, since it is an essential part of the differentia of judgment. What is this thing, transcending judgment and yet immanent in it?

There are two ways of answering the question, the epistemological and the metaphysical. The "something" which in judgment we mean is either *the known* or *the real*. The two answers are not easily isolable: they are the two sides of the same shield. What we

know is supposed to be the real, and the real is assumed to be the object of knowledge. Nevertheless, since it is always possible to raise the issue whether knowledge is not ultimately of appearance or whether reality is ever truly known, the two answers may be considered separately.

First, then, as regards the epistemological answer, namely, that judgment supervenes upon a state of awareness. I judge, for instance, that "this animal is dangerous"; this propositionally articulated belief presupposes the awareness of something evoking the belief and prompting the expression of it. Without this awareness there would be no occasion either for the belief or for its assertion. Awareness thus becomes the primary constituent of judgment. I judge only what I can be aware of. And awareness need not be taken to stand for mere perceptual immediacy. Its meaning may be broadened to include memory as well as perception, imagination as well as thought. Beliefs expressed in propositional discourse have reference to whatever in any way we can be cognizant of. As thus enlarged in scope, awareness may be seen to be anterior to every judgment, that is, to every formal statement of a belief. The "something," then, to which in judgment we refer, is what any act of awareness provides; this act is outside the judgment in the sense of being its prior condition or ground, but it falls inside it, since the judgment is nothing but the awareness reinstated in propositional discourse. From this point of view, no judgment can be defined in the absence of a prior relation to an act of awareness.

I am speaking of an "act" of awareness instead of an "object" of awareness in order to avoid the "existential" issue. For in avoidance of this issue lies the advantage of an epistemological theory of judgment. The question whether awareness is awareness of existence may be taken to fall outside the definition of judgment. If imagining or conceiving be an act of awareness, may I not in fancy or thought salute or embrace the non-existent? And assuming this to be the case with imagination or thought, it is difficult to make an exception of perception or memory. The facts drawn from illusions and dreams may always be cited against the view that in perception or memory we are aware of the existent. For the sake of eschewing the question of existence, we may speak of the "something" meant by judgment as that which in any act of awareness happens to be encountered. What is the difference between existence and non-existence? And what difference is there between one sort of existence and another? It is the task of metaphysics and not of epistemology to answer these questions. We must not say, then, that in judgment we refer to "objects" of awareness. The term "object" is notoriously ambiguous, signifying either the trans-

cendent occasion or the immanent content of awareness. The term "content" illustrates the makeshift to which we may be driven in our zeal to circumvent the existential issue. The same makeshift in the interest of "pure" epistemology is exhibited by the more specific terms descriptive of the so-called "content" of awareness: ideas, data, essences, universals—to mention but these—are all suggestive of existential neutrality. But let us take the bull by the horns. Let us go to the limit of existential neutrality and define judgment as a propositionally formulated belief at the behest of any act of awareness, leaving the question unanswered, involving as it does metaphysical considerations, precisely what ontological status belongs to that which awareness discloses.

Unfortunately, we can not readily avoid the existential issue. We can only do so by an arbitrary fiat. Belief expressed through logical discourse is two-dimensional. In judging that "this animal is dangerous," I do not confine my belief to the one level of awareness. I believe, not only that I perceive the animal, but also that the animal is there to be perceived. It is only in the interest of a pure theory of knowledge that I am required to ignore the level of existence. Actually, my perceptual judgment leads a double life, claiming membership in two separate worlds: it refers to the experience of the fact and to the fact experienced. The belief uttered by my perceptual judgment is the dual belief that my perception is veridical and that my percept is real. Nor is this duality of belief a peculiarity of perceptual judgments alone. All judgments are two-dimensional. There is no difference in principle between perceptual and non-perceptual judgments. The greater complexity of the latter consists in this, that their relevancy to the level of existence is less obvious or less direct. Mere discourse, valid without relation to anything beyond it, either to the belief inducing discourse or to the facts (apparent or real) meant by discourse, is, indeed, what "pure" logic is supposed to be engaged in. Whether pure logic is possible or not is a question that need not here be raised; at all events, judgments can be pure propositions only by deliberate abstraction. Logical propositions are concrete judgments violently disengaged from use and relevancy. And when judgments are employed, not as abstract counters in the game of logical discourse, but as vehicles of human belief, they are pertinent simultaneously to the two hemispheres of knowing and being. This duality of reference is the burden of all judgments, whatever their form and structure, whenever they are "meant" to be about "something" outside discourse itself.

The reference of judgment is thus a question that can not be answered by avoiding the existential issue. The metaphysical an-

swer consists in making this issue paramount; it asserts unhesitatingly that the "something" to which in judgment we are obliged to refer is the "real." For our purposes it matters little whether, dividing the judgment into two parts, we take one part (the subject) to represent the real and the other part (the predicate) to represent its character or attribute; or whether, taking the judgment as undivided, we consider the whole propositional assertion as the adjective characterizing the real; in either case, the important thing is that reference to reality is an integral constituent of the meaning of judgment. *To judge is always to judge about the real.* As an unexamined statement this sounds plausible enough. Many an eminent philosopher may be found uttering it as if it were a truism. Yet what does it mean? What precisely do we intend to convey by the "real" to which judgment is necessarily related? We are here confronted by one of the gravest ambiguities. Merely to state the ambiguity is to disclose the anomaly inherent in judgment.

Is the "real" the initial occasion or is it the final result of judgment? Is the "real" a mere name for something-we-know-not-yet-what or is it something already named or determined? In the one case, the real is unqualified, naked of characters, since whatever determinations it acquires are such as *ulterior* judgments attribute to it; in the other, the real is qualified, the possessor of those adjectives with which the work of attribution has *already* endowed it. And when it is asserted that in judging we always refer to the real, is it to the unqualified real or to the qualified real we are supposed to refer? Either supposition is laden with a paradox.

To assert that in judgment we refer to the real, but to the real as unspecified, the specification of it being the work of attribution performed by judgment, is to divest the initial reference of judgment of all significance. For the area of unspecified reality is without limit: it includes everything and it excludes nothing. Unspecified reality coincides with "being," that *summum genus* containing as species both the non-existent and the unreal. Prior to the discriminating and specifying work of judgment, everything imaginable or mentionable has being. It is to the labor of attribution wrought by judgment that we owe the distinction within the sphere of being between the existent and the real. Judgment, in attributing specific properties to "existence," spatio-temporal or other, does not annihilate the non-existent: the non-existent finds lodgment in the more commodious realm of "reality." There are non-existent but real things, such as the mathematical infinite and non-Euclidean space, to which judgment can attribute determinate qualities and relations. But the widest ontological area, the area of "being," provides room for whatever for any reason can not be said to have the attributes

either of existence or of reality. There is, strictly speaking, no such thing as non-being. While it is possible with the aid of specific attributes to distinguish the existent from the non-existent and the real from the unreal, it is not possible to refer to anything lacking in being; for anything imagined or conceived as wanting in being would at once acquire being in imagination or thought. Unspecified existence or unqualified reality is thus indiscernible from bare being; and bare being is catholic enough to contain non-being within its ample scope. In saying, then, that in judgment we refer to the real, but to the real as unspecified, we enter a universe of discourse where sense and nonsense meet on equal terms. We are virtually reducing to absurdity the judgment's reference to the "real," since it is a reference indiscriminately to anything and everything and nothing. To characterize such a reference as "existential" is manifestly paradoxical. Bare being, the home of everything, is the home likewise of the non-existent and the unreal.

The existential reference of judgment, to be genuinely existential, must therefore be to reality as specified or determined. The real to which judgment is relevant must have attributes. Without attributes anything is real; and if anything is real, nothing is real. The distinction between the real and the unreal is thus indispensable for an "existential" theory of judgment. It is the possession or non-possession of specific determinations which separates the real from the unreal; and if it is to the real as distinguished from the unreal to which in judgment we are supposed to refer, prior to the work of attribution by judgment the real must be assumed to possess those attributes by which it is distinguished from the unreal. But this assumption involves a tremendous paradox: before we can judge, if to judge is to judge the real, we must know by what tokens the real is marked off from its opposite. How can that be? How can I know whether the real which my judgment is supposed to mean is not actually the unreal?

Let me revert to my former illustration. The animal that I assert to be dangerous must somehow, if my judgment is to be genuinely existential, possess specific marks distinguishing it from an unreal beast. The paradox of which I speak is forced upon us as soon as we ask whether those marks (whatever they are) are distinguished and recognized without judgment or by means of judgment.

Consider the first alternative: judgment is not required to distinguish the real from the unreal animal. To say this is to demand that hallucinations be recognized as hallucinations by the subjects of them or dreams as dreams by the dreamers thereof. But this is psychologically not the case. But aside from this empirical dif-

ficulty, the assertion that in judging the animal to be dangerous we refer to something real, recognized as such by intuition, clairvoyance, or some other mental act distinct from judgment, involves us in a vicious circle. For the assertion in question is not an assertion of fact but an assertion of theory; it states that the real is such that its reality can be recognized without the aid of judgment, and that knowledge is such that prior to judgment we possess indubitable certainty of what the real is. But this theory at once metaphysical and epistemological, to be a theory and not sheer dogma, must obviously be rendered valid by some judgment. The circle is complete. I must defend by judgment the theory that without judgment the real animal can be distinguished from the unreal in order to provide a real animal for my judgment to refer to.

Nor do we escape the circle by the second alternative. To say that the real is distinguished from the unreal by means of judgment is to say in effect that judgment has no *real* animal to which to refer until judgment has made such reference possible by a description of the animal's existential properties. In judging we are supposed to *refer* to the real, but the real to which in judgment we refer is what the judgment itself *describes* to be real. Can anything be more circular? If the distinction between the real and the unreal is a distinction made *by* judgment, then the existential reference of judgment is existential only in case the judgment to which we entrust the office of separating the real from the unreal is a valid judgment. Once more we find that the cart is put before the horse. The reference to the real presupposes a description of the real. Thus it is not to the real to which in judgment we refer, but to a *theory* of the real, i.e., to the real as envisaged by this type of metaphysics or that.

The paradox of judgment here discerned has a double aspect. In the first place, it results from the shifting and ambiguous senses of the "real." As long as the "real" can vary in meaning, suggesting either the neutral sphere of everything mentionable by discourse or the eulogistic domain from which the "unreal" is banished by metaphysical fiat, the "existential" character of judgment remains essentially anomalous. And in the second place, the paradox is due to the fusion of two separable acts which the judging process is called upon to discharge. The anomaly of judgment lies in the fact that judgment is at once *reference "to"* reality and *description "of"* reality. But this aspect of the anomaly requires to be made more explicit.

What is the difference between reference and description? The meaning of reference is obviously "relational." To refer to an object or a situation is to point in its direction or in some other way

indicate its presence. Of the features peculiar to reference as an indicative relation may be mentioned the following three: (1) Reference to an object does not specify its nature: it merely rivets attention upon it. (2) Reference is a relation essentially catholic in application: it is compatible with anything and everything. (3) Reference is a relation intrinsic to one, but extrinsic to the other (or others) of its terms: a sign-post, for instance, pointing to a highway must needs refer, but it is not an intrinsic part of the highway to be referred to. In all these three respects description differs from reference. The function of description is "adjectival": (*a*) To describe an object is not merely to indicate it: it is to specify its nature by attributes. (*b*) Determination by adjectives is obviously limited in application: it is limited to whatever actually possesses the attributes signified by the adjectives in question. (*c*) And the adjectives employed in the description are names for characters constituting the intrinsic nature of whatever the description is supposed to describe.

If the difference between reference and description is at all valid, its application to judgment enables us to unite in one precise statement the double aspect of the paradox inherent in judgment. Reference of judgment *to* the real and description of the real *by* judgment constitute a single act, since the only mode of reference to the real which judgment can establish is by describing it; yet the referred real and the described real, distinguishable by analysis, can not be made to coincide. The referred real is indeterminate, the described is determinate. The real referred to is neutral in the sense of favoring no particular attribution; the real described is limited by the characters attributed to it. The referred real is the *subject* of characterization; the described real is the characterized *object*. The referred real is the genus; the described real a species of it. The referred real (in the language of the schools) is substance; the described real one of its accidents. The referred real coalesces with the boundless sea of being; the described real represents an arrested wave.

The reference of judgment (which is simply its transitive relation of being) and the description of judgment (which by adjectival attribution is a limitation of being) are, though distinguishable, actually fused in the unitary act of judging; and this is the ultimate ground of the paradox. For it is the ineluctable nature of judgment to express its transitive relation to reality by an adjectival description of it. Hence the following dilemma. Either reality is prior or it is posterior to the descriptive act of judgment. If reality is prior to the descriptive act of judgment, it is nothing that judgment can descriptively refer to, since the conception of something

anterior to the description of it is what we literally mean by the nondescript: it is the realm of indefinite being, the night where all cows are black. And if reality is posterior to the descriptive act of judgment, it is no longer reality we are dealing with, but an ontology; if reality is what judgment by the work of its attribution limits it to be, judgment is in the ludicrous position of referring to, and thus describing, its own description. In short, either there is nothing real for judgment to indicate and to describe, or else the famous "existential" reference of judgment turns out to be a description of a description.

From this dilemma there is no escape as long as theories of judgment continue to employ the phrase "existential reference" as if its meaning were self-luminous and unambiguous. The dilemma which the phrase involves can be avoided only by a definition of judgment which undertakes to make explicit that the reference of judgment is not what the judgment itself succeeds in describing. The paradoxical phrase must be exercised. Judgment is never existential reference, if "reference" be regarded as other than description, and if "existential" be viewed as denoting a determinate sphere within the area of being. The reference of judgment is identical with description; and what it describes is some aspect or mode of being as disclosed in awareness. And since awareness may be of the unreal and the non-existent, the datum of awareness, never problematic as regards its being, is always problematic as regards its reality or existence until judgment has determined its ontological status. Judgment, therefore, should be defined as a descriptive response or belief of a self in terms of propositional discourse in the presence of a problematic situation as encountered in awareness. This definition is compendious enough to include all the conditions—psychological, logical, epistemological, metaphysical—that are present whenever any judgment is present. And it is general enough to be applicable to every sort and form of judgment. A detailed defense of this requires, however, a discussion more lengthy than the present occasion allows.

UNIVERSITY OF CALIFORNIA. J. LOEWENBERG.

A HYPOTHESIS OF REALMS[1]

I

FOR some time I have been working on a so-called "hypothesis of epitomization" to the effect that the structures and processes evident in the data of the physical, biological, and neuropsy-

[1] Read, in part, at the meeting of the American Philosophical Association, Chicago, December 28, 1927.

chological sciences exhibit resemblances which are significant for a realistic metaphysics.[2] This view receives, I think, some corroborations from contemporary philosophies of emergence, organic mechanism, *Gestalten*, energy patterns, and holism. It may be summed up by borrowing Lloyd Morgan's statement that "life stands to matter in the same kind of relation as mind stands to life,"[3] and diagrammed in the familiar (although only partially adequate) pyramidal scheme.

Recently it has seemed to me that, if this way of treating the data can for the sake of the argument be provisionally adopted, and if the terms "matter," "life," and "mind" can be used each to designate a realm, there are possibilities of a fascinating downward extension of the treatment to include what I would call other realms. Believing as I do that what Broad calls the speculative philosophy[4] is sometimes in its own way as important as the critical philosophy, I should like to attempt such an extension, even though the attempt must be made in a preliminary and inadequate way.

The tentative method, if we may call it that, consists first in studying the data of the physical, biological, and neuropsychological sciences to detect, if possible, some of their relationships, and then in attempting to detect these relationships in other data. With regard to the sciences just mentioned (or the realms of matter, life, and mind, respectively) we find that each realm is made up of what we may call monads of various levels; for instance, the physical is made up of electrons, atoms, astronomical bodies, etc., the biological is made up of unicellular organisms, multicellular organisms, etc., and the neuropsychological is made up of nervous structures of various grades in their characteristic activities. Further, we find that of the three realms, matter and life and mind, beginning with the first, each is to the one following it in the relation of container and contained. The physical contains the biological, and the biological, at least for ordinary views, contains the neuropsychological. Once more, although the point will not be so obvious and can not here be developed in detail, we find that the monads of each level in each realm exhibit four interrelated characteristics of (1) relative individuation in the midst of a milieu which usually contains prior monads, (2) interactions of appropriation and rejection of portions of the milieu and of prior monads, (3) repeated production or else reproduction of new monads of the given level, and (4) segregation, whether by integration or differentiation, of monads of the given level into monads of another level. For example (choos-

[2] See, *e.g.*, G. P. Conger, "What Are the Criteria of Levels?", this JOURNAL, Vol. XXIII (1926), pp. 589–598.

[3] C. Lloyd Morgan, *Emergent Evolution* (1923), p. 29.

[4] C. D. Broad, *Scientific Thought* (1923), pp. 20 ff.

ing two instances almost at random from a multitude which a systematic exploration would show), we find that an atom in its interactions absorbs light in a process comparable with the process wherein an organism ingests food, and that planets, like the more complex of the biological organisms, apparently owe their origins to a process which Chamberlin has called "bi-parental."[5] The resemblances, as might be expected when one thinks of pictures like the "solar system atom" (not altogether supplanted by recent developments in theoretical physics) and of metaphors like the "death of a star," are quite striking, and become more so when the treatment is systematic and detailed. The differences are also striking—to most investigators, more striking than the resemblances. But the differences, I think, have to be understood in the light of the resemblances, as indicating throughout the various levels of the realms of matter, life, and mind, a progressive segregation of monads which, even as they become more and more complex, exhibit similar characteristics. The progressive segregation, whether it be regarded as integration or differentiation, when taken over a long range of development, through many levels, seems to amount to a cumulative coördination. For example, by reason of the rate and intricacy of the metabolic processes, each living organism effects a kind of concentration and coördination of the structures present and the processes going on in the earth and in other organisms around it. The living organisms are so individuated that in general when viewed at this level the process of coördination seems diversified and scattered; but in a certain large sense all the organisms may be said to be involved in the earth's equilibrium conditions, although the organisms register these conditions rather than modify them to any important degree. Again, and similarly, at their own levels and in their own way, by reason of the rate and intricacy of the neuropsychological processes, each nervous reflex or configuration effects a concentration or coördination of structures and processes in the environment, the organism and the other reflexes or configurations. Here again, if the reflexes are taken one by one, the coördination appears to be diversified and scattered; but at the same time the nervous system as a whole coördinates the structures and processes mentioned, and according to all the views this side of extreme fatalism, not merely registers, but also modifies the equilibrium of the organism and the events in the environment.

It may be observed that all this is a way of supplying detail to the statement of Lloyd Morgan above quoted. Matter and life and mind each exhibit a series of levels with analogous structures and processes; the three realms are in a transitive relation of container

[5] T. C. Chamberlin, "The Genesis of Planets," Carnegie Institution of Washington *Year Book*, Number 23, p. 275 (1924).

and contained; life is a cumulative coördination of matter, and mind is a cumulative coördination of matter and life.

Without attempting here to defend these generalizations in further detail, let us, for the sake of the argument, attempt to make use of them in a possible extension, to see if they can be made to suggest anything else interesting or important for metaphysics.

II

In considering the possibility of such an extension and the direction which it might take, my first point is that there are certain tendencies in contemporary thought which, somewhat like the perturbations of Uranus for the astronomers years ago, may well lead us to look beyond the more easily recognized limits of matter, life, and mind for other factors at work upon them and within them. Let us indicate briefly four such tendencies.

1. In the first place, and as a kind of recantation of some views formerly expressed, I would put the realistic thesis that the logical and mathematical forms and relations are in some sense independent of our minds. This is a part of the theories familiar under the terms "essences" and "subsistents," and a part which I am now inclined to accept. Some other parts of these theories call, I think, for separate treatment, but let us consider first the independence of the logical and mathematical data. There are some arguments on the other side, in terms of Kantian categories or pragmatic conveniences. It is, of course, true that we, as persons, make use of these logical and mathematical forms and relations, and that they are inconceivable except as somehow conceived by minds. But I think we need to remind ourselves that while, strictly speaking, there are no "proofs of realism" any more than of idealism, we are living in a time of scientific discovery which, if it is not actually shifting the center of gravity in metaphysics from the inner world to the outer, is certainly imposing a greater and greater stress upon the theories which would keep the center of gravity where it was in the days of Kant and Fichte. The universe as revealed in modern days and ways is so overwhelming that mind needs some other title than that of self-appointed legislator for it. Mind must register before it can regulate.

Now as regards the logical forms and relations, what does mind register concerning them? The idealist regards them as so ingrained in the nature of mind that they are ineradicable. The realist regards them as so characteristic of the nature of the world that they are inevitable. On either view they exhibit a remarkable persistence. We may emancipate logic from experience, and make it theoretical and formal; we may emancipate it from syntax, and make it mathe-

matical and symbolic; we may emancipate it from existence and make it contemplative or arbitrary—and still we have, either "in" our minds or "on" them, the logical forms and relations. It is like writing a book to deny the efficacy of writing; perhaps it is like fighting a war to end war. The logical forms and relations are presupposed in discussions about them and in explanations of them—even in attempts to explain them away. Logic seems to dissipate itself in an infinite regress of propositions about propositions, in which after a while the mind loses all interest if not all proprietorship. But just in proportion as the regress becomes empty of content, it seems to exhibit more and more clearly the outlines of logical structure and form. When Kant discovered anything which he took to be ineradicable he put it down as indicating the primacy of mind and belonging to the prolegomena of any future metaphysics; but that was before the laboratories and the observatories had spread so widely the suspicion that mind is a late comer into the universe of matter and life, and that metaphysics may suffer from too much prolegomena—particularly of the epistemological variety.

Accepting, then, the realist view as on the whole more adequate in such an overwhelming universe, I would be inclined to regard the logical structures as essentially independent of our minds. This is an assumption, of course; but I think the opposing view is a presumption. But if one accepts the realist view, there is the further problem of assigning to the logical structures a status which, as regards the other data, will be consistent and orderly; and that status, the more one studies the problem, seems independent not merely of mind, but of life and matter as well. The possibility begins to open that the logical structures themselves belong in a realm, comparable to the realms of matter, life, and mind, although at least as different from any of these as these are different from one another. I may add that if it can be shown that the logical entities constitute a realm, I think it would strengthen the realist argument that those entities are independent of our minds; this may be reasoning in a circle, but at any rate it is reasoning in a great circle rather than in a small one.

With the mathematical relations the case is somewhat different. In algebra and geometry the postulates and procedures may vary, and can be analyzed to the point where it is seen that they do not presuppose prior mathematical postulates, but only prior logical postulates. But it has often been remarked that, given a set of postulates and procedures appropriate to them, the mathematical relations also seem to confront us with a sheer inevitableness, whatever be the choices which we may seem to exercise with regard to them.

It is still possible, and doubtless always will be possible, to interpret mathematics in Kantian fashion; but certainly the realistic movements which attempt other interpretations are more likely to fit the trend and temper of a scientific age.

2. Taking this view that the forms of logic and of mathematics are in the last analysis essential rather than experimental, one is over the threshold of the domain of universals, essences, subsistents, and eternal objects which, ever since Plato, have been thought necessary either to "save the appearances" or to supplant them. And the question arises, "If you admit that the logical and mathematical relations are independently real, and somehow hold between independent entities, must you not also admit that all the so-called essences and subsistents are just as real? Is not a color just as real as a logical form, or a tone as a mathematical relation?" I must leave this question for a moment, to return to it presently; here it is in place merely to say that any one seeking possible extensions of the results of scientific observations and experiments must be impressed by this long sustained realist tradition. It seems to be at least an argument *that* there may be realms independent of us which are not exhausted in our empirical sciences, although on the question just *what* these realms are, or in what they consist, the hypothesis I am about to develop will differ from some of the current theories.

3. Once more, in casting about for suggestions, I am impressed with certain great steps which in recent years have been made toward the unification of some of our more abstract theories about the world. There seem to be a number of what Lovejoy might call "reductive"[6] theories comparable to behaviorism, with its attempted reduction of psychology to physiology, and to mechanism, with its attempted reduction of biology to physics and chemistry. Take, for instance, first the so-called "geometrization of physics," with its relativistic interpretation of what used to be called a physical force as the discrepancy which arises when the processes of nature are referred to an unsuitable (e.g., Newtonian) frame of reference,[7] and of matter as a disturbance in a gravitational field.[8] One might think also of the "logicizing of physics," whereby a piece of matter is defined as the laws, symmetrical about centers, governing events in empty space.[9] Again, suppose we analyze space-time into what were once regarded as its ultimate elements, point-in-

[6] A. O. Lovejoy, "The Meanings of Emergence and its Modes," in *Proceedings of the Sixth International Congress of Philosophy* (1927), pp. 29, 30.

[7] A. S. Eddington, *The Mathematical Theory of Relativity* (1922), pp. 37–38.

[8] A. S. Eddington, *Space, Time, and Gravitation* (1921), p. 190.

[9] Bertrand Russell, *The Analysis of Matter* (1927), p. 324.

stants; we are confronted by Whitehead's definition of a point of timeless space as a class of event-particles and of an event-particle or point of instantaneous space as a group of abstractive sets,[10] as well as by Broad's definition of points as logical sums of classes of series of volumes.[11] Such a reduction from the field or the terms of one discipline to those of another is still more directly evident in modern work on the foundations of algebra and arithmetic. When a number is defined as the class of all classes similar to a given class,[12] or in any other similar way, we have a plain indication that numbers may, if one analyzes them far enough, be reduced to logical relations, or logical entities, or both.

4. It is evident enough that in the more familiar cases of reductive theories which we know as behavioristic psychology and mechanistic biology, certain synthetic theories—variously held and known by the terms "creative synthesis," "emergence," "*Gestalten*," "holism," and the like—have been brought up to offset the reductive trends. At the beginning of this paper we supposed for the sake of the argument that such views, which (without at present drawing the finer distinctions) we summed up in the characteristic of "segregation," are descriptions of what goes on in the realms of matter, life, and mind and account for the transitions between them. And the question arises, Why may we not treat the less familiar reductive theories as we do behaviorism and mechanistic biology? Why not consider the possibility of synthetic interpretations there also? And all these points now taken together lead me to a hypothesis of realms.

III

The hypothesis which, in the hope of discussion, I would suggest is that, taken now in the order the reverse of the reductive order indicated above, the logical entities, numbers, and the entities or events of geometry-kinematics may be considered to constitute realms prior to and leading in orderly fashion up to matter and life and mind; and that logic, number, and geometry-kinematics are related to one another as matter, life, and mind are related to one another. In order to develop the hypothesis as far as possible here, I shall ask that we look once more at some facts and assumptions concerning matter and life and mind, in order, if we can, to discern there the criteria of realms. We may say that, first, a realm contains an orderly series of what we have called levels. Second, a given realm by its orderly processes throughout its levels leads sooner or later to a level which, although contained within the given realm, marks the beginning of a new realm developed there, with new levels and,

[10] A. N. Whitehead, *The Concept of Nature* (1920), p. 86.

[11] C. D. Broad, *op. cit.*, p. 51.

[12] Bertrand Russell, *The Principles of Mathematics* (1903), p. 115.

if one wishes to use the term, with new emergent qualities of its own. Examples are (presumably) primitive organic compounds in the earth as the beginning of the realm of life, and excitation arcs with neuroid conduction in the sponges as a beginning for neuro-psychology. Third—although this, as was said, can not be shown in detail here—the monads of various levels in all realms may, for the sake of the argument, be assumed to exhibit characteristic individuations, appropriations and rejections, productions or reproductions, and segregations into monads of different levels. Fourth, through all the realms of matter, life, and mind, at least, there seems to run a process which we called cumulative coördination. Now I think there are some indications that the data of logic, number, and geometry-kinematics conform to these criteria of realms.

IV

When we examine the data of logic, to see if logic satisfies our first criterion by exhibiting an orderly succession of levels, there rises as a candidate for recognition the familiar metaphor of "atomic" and "molecular" propositions, which Ogden and Richards have extended in one direction by speaking of "electronic" references,[13] and which any one has virtually extended when he speaks of a "universe of discourse," or, still more, of "universes of discourse." Of course, the immediate criticism would be that these are only metaphors; but I would reply first that it seems to me to be at least an open question, and one of no small importance, whether we have not underestimated the significance of some of our metaphors, and whether, after all, the metaphorical may not afford us some of our most fruitful insights into the metaphysical. There is also another answer here, for any one who refuses to deal with such doubtful matters as metaphors; this other answer appears in a consideration of the doctrine of logical types. Whatever else may be said of this doctrine, it seems at least to show that a given range of propositions can be treated in propositions which can not belong to the first range, but which have a range of their own, and that these latter propositions can be treated in still other propositions belonging to still another type, and so on. At least some of the contradictions which have been encountered in dealing with the doctrine of types may be resolved precisely by the recognition that propositions belong to different levels, or at least sub-levels, of inclusiveness and range. Statements about the statements of Epimenides, for example, belong in a different range than statements made by Epimenides.[14] It is easier to detect such differences of level

[13] C. K. Ogden and I. A. Richards, *The Meaning of Meaning* (1923), p. 163.

[14] Cf. B. Russell, *Introduction to Mathematical Philosophy*, (1919), p. 188 f.

in arithmetic and algebra, where the series of powers of a number, as found in equations of higher and higher degree, furnishes, I think, all that is necessary for our general hypothesis. For geometry the same remark could be made with reference to figures of successively higher numbers of dimensions.

We said that the second criterion of realms, as judged by the relation of matter, life, and mind, is that one realm with its processes and levels sooner or later leads to a level which, although contained within the prior realm, marks the initial level of a new realm. Here again it appears that logic exhibits the requisite properties, since terms are included in classes, some of these classes in classes of classes, and some of these latter in classes which are similar to a given class—that is, are numbers. Numbers, with the properties peculiar to them, thus are built up out of, or appear in the midst of, series of classes.

We noted that within their own realm, numbers rise in series of successive powers, which we took to be analogous to successive levels. We come now to a question of considerable difficulty in connection with the hypothesis—the question, namely, whether we may think of the series of powers of a number as giving rise to point-instants, the initial members of the realm of geometry-kinematics. Here I can do hardly more than suggest some approaches to the problem, but I find that there are several such approaches, any one or all of which might serve for the transition. First, Broad in his exposition of Whitehead's method of extensive abstraction defines a point as the logical sum of classes of series of volumes, and holds that thereby he determines a logical function which will do the work of a point and hence for geometry will be a point, no matter what its internal structure may be.[15] But I think one might say that the important function here is not so much that of logical addition, which rules out alternative convergences, but rather the function or relation of inclusion. It is not merely the inclusion of one series within a class of series, but the inclusion of any one member of a series of converging volumes within other members of that series. The essential feature is the relation of inclusion rather than the fact that volumes are what happen to be included in other volumes. It may be objected that in this interpretation I pass unjustifiably from spatial inclusion to logical inclusion; but it may be replied that such a passage is just what one might expect when one sets out to reduce the structures and processes of one realm in the direction of those of another, and that the more familiar results of physiological psychology and of biochemistry represent use of the same principle. I see no reason why Broad's reductive procedure may not

[15] C. D. Broad, *op. cit.*, pp. 39, 51.

be reversed, and why volumes (or areas, or points) may not be treated as relations between series of entities which exhibit the property of inclusion. And if Broad is right in saying that anything which will do the work of a point will be a point, it may be that we can attach a non-geometrical interpretation to the "series of entities which exhibit the property of inclusion" and still satisfy the requirements of geometry. In this connection it is interesting to note that Huntington has worked out a set of postulates for abstract geometry, expressed in terms of the relation of inclusion which he leaves undefined.[16] Now it would seem, further, that series of powers of numbers might exhibit just the transitive relation of inclusion which is here looked for, and that series of powers of numbers might, under appropriate conditions expressed in postulates, do the work of a point. If this is so, minimal segments of such series might be regarded as doing the work of point-instants. There seems to be some cross-classification presupposed in the "cutting out" of a segment of such a series; this suggests a second approach to the problem, namely, that of Whitehead's definition of geometry as the science of cross-classification, the system of which is richer in intrinsic mathematical properties than is the hierarchy of classes essential to the general theory of cardinal numbers.[17]

Still another approach is suggested by Russell's statement that any geometry, Euclidean or non-Euclidean, in which every point has coördinates which are real numbers, can be interpreted as applying to a system of sets of real numbers—that is, a point can be taken to be the series of its coördinates. Russell says that this interpretation is legitimate and convenient when we are studying geometry as a branch of pure mathematics.[18] Finally, if one still encounters difficulties in deriving the properties of geometrical structures from those of numbers, one may here have recourse to such a concept as emergence, and say that, while at present we do not know how to account fully for the transition, we may regard it as being as well authenticated as the transition from matter to life or from life to mind.

The question whether, after a certain number of spatio-temporal dimensions have, as we might say, been generated, one can derive from such spatio-temporal configurations the realm of matter seems actually to be coming into debate in mathematical physics. Here again we find a reductive procedure, where, according to Eddington, Einstein approaches the mathematical expressions from the physical

[16] E. V. Huntington, "A Set of Postulates for Abstract Geometry, Expressed in Terms of the Simple Relation of Inclusion," *Mathematische Annalen*, Vol. 73, p. 523 (1913).

[17] A. N. Whitehead, *The Axioms of Projective Geometry* (1906), p. 5.

[18] B. Russell, *op. cit.*, p. 5.

side; but Eddington approaches them from the deductive side, "endeavoring to show as completely as possible that they must exist for almost any underlying relation structure." [19] It is now becoming increasingly clear that the physical world can be analyzed reductively into relation structures in space-time. Why, then, may we not look, here as elsewhere, for a reverse synthetic process, in which matter—or, to start with, radiations—appear when spatio-temporal frames of reference are superposed? Why may we not, if need be, regard the discrepancies between the frames which we call forces or the conditions which we call "mass" as emergents due to the new "togetherness" of the frames? Such considerations from other realms are no substitutes for equations which have not yet been discovered; but at least they do not hinder the search.

The third criterion, which has to do with parallelisms of characteristic structures and processes, requires a working out of the detailed data on relative individuations, interactions, reproductions, and segregations at the various levels. Although I have done some work on it elsewhere,[20] here it must be left open as a field for exploration. I can say only that, as regards interactions, in logic affirmative predication appears as the appropriation of a relation or attribute by a subject-term, and negative predication appears as a rejection—each with consequent modifications in the structure of a subject-term. Algebraic equations, for instance $a + b = c$, are similarly interpreted as processes wherein a part of the left-hand member, by the operation of appropriation indicated in the plus sign and what follows it in that member, undergoes the change registered in the right-hand member. The motions or manipulations of figures in geometry can also be considered in this way.

The fourth criterion of realms was that through them there should run, as we might say, a process of cumulative coördination. If the world consists merely of matter and life and mind, we may say that the process culminates in mind, which in the gradual integration of experience coördinates the other processes. I see no reason why this process does not extend also to the data of logic, number, and geometry-kinematics, nor why mind may not be said to be operating in similar fashion, selectively and progressively, within these boundless realms. Further, I should think that the progressive segregations on the way to mind indicate that each of these realms exhibits in its own manner a cumulative coördination of the preceding realms. If one would use the word with the same caution with which Alexander uses it,[21] he might say that each succeeding realm is the "mind" of the preceding realm.

[19] A. S. Eddington, *The Mathematical Theory of Relativity*, p. 224.

[20] G. P. Conger, *A Course in Philosophy* (1924), Appendix B, pp. 501 ff.

[21] S. Alexander, *Space, Time, and Deity* (1920), Vol. I, p. 44.

My conclusion, then, is that there is a chance for a consistent argument that logic, number, geometry-kinematics, matter, life, and mind form a progressive series of realms offering at least a framework for a realistic metaphysics to be developed in accordance with the data of the various sciences both natural and abstract.

V

A word more concerning some philosophical consequences. It appears to me now that the theories which regard colors and the like as essences read a neuropsychological process back into the structure of the world, and so belong with what Lovejoy calls "retrotensive"[22] theories, like panpsychism and hylozoism. The retrotensive theories are not necessarily wrong, but they ought, I think, to be studied together. I should say that real essences or subsistents are to be found in the realms of logic, number, and geometry; but, on the most economical interpretation, what is essential or subsistent seems rather to be inevitable logical forms than any exemplification of those forms in contentful propositions, and to be numerical and spatio-temporal configurations rather than any other particular object or objects, process or processes. I do not see that it is necessary to read the qualities of our perceptions or the content of our concepts back into any prior realms, any more than it is necessary, as for panpsychism, to read the quality of our feelings, or in hylozoism the quality of our metabolism, back into the physical cosmos. I can see some reasons for such confusions. Because of the cumulative coördination we see everything from the point of view of mind, from the apex of the pyramid, and forget that the base is wider as well as lower than the apex. Moreover, the cosmos exhibits analogous processes of appropriation and rejection, and we forget that these are on different levels. And then, also, structures within each realm have a way of segregating their components by "breaking down" into structures of prior realms. The discharge of a nervous impulse in muscular contraction is a breaking down from neuropsychological to physiological; the death of an organism is a breaking down from biological to physical; and if there is integration between the other realms there is doubtless disintegration also. This last statement raises the question whether any processes at all may be regarded as characteristic of the "subsistent" realms of logic and mathematics. Briefly, it seems to me to be little more than traditionalism which demands that the realm of subsistents be static; so far as I can see, if its processes are reliable and are characterized by certain structural features, any subsistent may be in flux. And I should think the subsistent must either exhibit processes analogous to those of the

[22] A. O. Lovejoy, *op. cit.*, p. 30.

existent realms, or else exhibit certain relations which we from our point of view construe as processes, if the processes which we find to be existent have any deep metaphysical ground. I note that philosophies which deny processes to the subsistent seem to have difficulty in deriving the existent from it.

Finally, it may be noted that such an hypothesis, with its indications that there are at least two realms, logic and number, which are prior to space-time, tends to weaken any spatio-temporal terms or metaphors when these are generalized for use throughout metaphysics. For this reason, evidently "configuration," or perhaps even "type of order" is on the whole better than "level." And evidently the notion of evolution, if it is to be retained as a metaphysical generalization, must be freed from what has sometimes seemed its necessary implication of time.

GEORGE P. CONGER.

THE UNIVERSITY OF MINNESOTA.

BOOK REVIEWS

Possibility. SCOTT BUCHANAN. (International Library of Philosophy, Psychology, and Scientific Method.) New York: Harcourt, Brace & Co., Inc. London: Kegan Paul, Trench, Trubner & Co., Ltd. 1927. Pp. 198.

In reading Mr. Buchanan's essay, the sympathetic student is likely to experience that pleasure which Pascal expressed when he spoke of looking forward to seeing an author and finding, instead, a man. One expects an abstract treatise on epistemology, and one discovers with delight the record of an intellectual adventure and the breadth of personal inspiration.

It would appear that, like so many others who have turned to technical philosophy for aid in mapping out a way of life, Mr. Buchanan found himself at first more than ever bewildered by the plurality of systems offered in the guise of absolute truth. The recourse to technical philosophy, so far from simplifying the problem, seemed only to complicate it the more through the addition of new technical systems to the already existing multiplicity of cultural outlooks. It became necessary, therefore, to find an intellectual principle, a principle of method by which to orient himself through the maze of philosophic systems. The essay on Possibility presents some of the results of this preliminary quest.

Readers of this JOURNAL will perhaps recall a brief article by Mr. Buchanan discussing the ontological predicament of current epistemology.[1] It was this predicament which showed Mr. Buchanan

[1] This JOURNAL, Vol. XXI, Pp. 505–507 (Sept. 11, 1924).

the way out of the jungle of intellectual overgrowths. The epistemologist, he pointed out, starts with the copy theory of truth; he believes that the world is as science or knowledge paints it and that to every idea or relation of science there corresponds a real object in the external world. But having started out in this manner, the epistemologist ends up in an *impasse*. He finds it impossible to justify the objective reference of his ideas save by a *salto mortale*, an act of faith which affirms (in the manner of the mediaeval ontological argument) that his idea is such that it necessarily implies the existence of its object. By force of his extreme realism, the epistemologist becomes a naïve idealist! Now for any one who can read the signs, the way out of this predicament is written on its face. The mistake of the epistemologist has been to put discursive or conceptual knowledge on the same plane with the world of sense of experience and to attempt to establish a causal relation between them. Between discursive knowledge and the experience which is known, says Mr. Buchanan, there exists a relation of modality. If the experience which is known be called the actual, then knowledge is of the nature of the possible. And possibility has a peculiar constitution—a constitution which Mr. Buchanan illustrates by means of this figure:

"Possibility," he says, "plays a part like that of the prism in the analysis of light. Just as sunlight is broken up into a manifold of color by passage through the prism, so experience is referred to the concept of possibility and spread out into a thousand and one possible worlds which are to be understood only if they are known to be so produced."

The figure needs to be interpreted. The first thing that is to be noted is the refractive power of possibility. Possibility breaks up the actual into a thousand and one fragments. And each of these fragments may be broken up (in a way that is perhaps not directly suggested by the figure of light) into a thousand and one sub-fragments. Knowledge as possibility may in turn be made the object of a second knowledge, reflecting a possibility of a higher order, and so on *ad infinitum*. The world of possibility is thus radically refractive —radically expansive and pluralistic, one might add. But in proportion as we expand the realm of possibility, to that extent does it become more and more abstract, more and more removed from concrete actuality.

Offsetting this refractive nature of possibility, is the qualification laid down in Mr. Buchanan's figure that the world of possibility, the world of discursive knowledge, can be understood when we retrace our steps and know the manner in which possibility is generated out of actuality. Were it not for this proviso, the identification of

knowledge with possibility would be equivalent to an attitude of complete scepticism. Knowledge would be powerless to attain its object. But Mr. Buchanan distinguishes between science in its living character and science in its formal or ghostly aspect. Science in its living character is an attitude functioning in a process—it is possibility discerned in the actual and referred back to the actual according to a certain rule or method. Without this reference to actuality, without this continual revitalization in concrete judgment, science would degenerate into the repetition of lifeless and meaningless concepts.

In order to clarify the conception of science as possibility, and to allay any imaginative misapprehensions, Mr. Buchanan has further analyzed the world of possibility by means of a notion borrowed from mathematics, the parameter. In mathematics a parameter is an identity condition used as a basis for studying variability. Thus in analytic geometry it is a constant, k, determining a system or family of lines or curves, and these lines or curves are made explicit by the substitution of specific numerical values for k. Mr. Buchanan would generalize this notion of a parameter and apply it to scientific methodology. If this generalized notion were to be defined in the terminology of epistemology, it would have to be called a "particular-universal"—and this will indicate the methodological rôle which Mr. Buchanan assigns to the parameter. While logicians and epistemologists worry over the relation of universals to particulars, Mr. Buchanan seeks to confound them and to show the falseness of their problem by introducing a notion which is both a universal and a particular—or a constant and a variable, if we may so put it. And this notion, moreover, is not a rare mathematical curiosity, but the basic notion of all intellectual thought, as everyone would recognize were it not for the ambiguities of verbal discourse. Consider the equation, $x + 2y = k$, where k is an "arbitrary constant." K, as we have said, determines a whole family or system of lines, in such a way that if we substitute a value for k we get a specific straight line, a first-degree equation in the variables x and y. If we say $x + 2y = 6$, then x and y have a certain definiteness by virtue of their place in the equation—they can not, for example, represent imaginary values. And although the mathematician calls them variables, because a whole range of real values may be substituted for them, they may also be called parameters, in the generalized sense of the term, inasmuch as they are, in one sense, determinate, and, in another sense, variable. For methodological purposes x, y, and k are all parameters, but k is a parameter of a higher order, since it determines the system of x and y equations, while x and y determine the values in a particular equation.

The elementary example we have given is an illustration both of parametric structure, or the hierarchical nature of possibility, and also of the rule of operation characterizing parameters or possibilities. It is to be noted that while a parameter is a determinate entity or relation, it is none the less a sort of blank check as regards the lower orders of parameters—a blank check to be filled in according to the rules governing the equations. Now it is of such stuff that intellectual science is made. What, after all, are matter, atom, electron, time, space, but parameters arranged in proper subordination and correlation? The structure of scientific theory is an illustration of parametric order. On the other hand the relation of scientific theory to experience, the reference of universals to sense judgments, is also an illustration of the parametric relationship. The universal, horse, or stone, is nothing but a parameter—the possibility of seeing a particular horse, or stone. And if it be argued that we do not see the universal horse or horseness, but only particular horses, it proves Mr. Buchanan's point. Real knowledge is constituted by the synthesis of a parameter and an individual whole; or, in other words, by the union of concept and intuition in the direct judgment. "Intuitions without concepts are blind, and concepts without intuitions are empty."

While the doctrine of parameters lends a certain solidity to Mr. Buchanan's conception of science as possibility, it would be a mistake to assume that we have here a completed system or an analysis of ultimate principles. Mr. Buchanan insists that his work is tentative and methodological, and not at all an essay in metaphysics. Indeed it might be said that what he has done is to give a behavioristic account of science and science-building, leaving the question of its ultimate interpretation for future consideration. But even this behavioristic, structural account of science has tremendous practical consequences. It is sufficient to enumerate a few.

First, philosophy as criticism. Since we do not know reality directly, but through the medium of possibility, the task of the philosopher is obviously to serve as critic and not as scientist. For inasmuch as his material is knowledge itself and knowledge is not reality but possibility, he would simply be soaring into the upper airs of possibility were he to persist in his scientific construction. On the other hand, if he chooses to work as critic, he has plenty of fruitful work cut out for him. He can retrace the steps of the scientist and clarify the field of scientific possibility by referring it back to the original locus in which it was selected. To this question we shall return later.

Second, scientific dogmatism. Once grant the conception of science as possibility and we shall cease to concern ourselves with the

clash of the various naturalistic systems of metaphysics erected around the viewpoints of the special sciences. We shall take them for what they are—for *points of view,* or refracted rays of possibility. In fact, Mr. Buchanan's conception of parameters enables us to appreciate how all these systems—biologism, psychologism, naturalism, etc.—illustrate the same tendency—they differ only in the specific values that are substituted for the king parameter and for the subordinate parametric relations. But as all parametric systems constitute possibility and not actuality, the moment we see the fallacy of identifying one of them with the metaphysical whole we see the fallacy of all such attempts.

Third, dynamistic ethics. Here the misuse of the notion of possibility is the inverse of that in scientific dogmatism. Where the dogmatist identifies a parameter or a single system of parameters with the actual whole, the self-realization school of idealism has taken the whole expansive realm of possibility for its legislative province. The doctrine has its source in Aristotle, for whom happiness and the good life consisted in the realization of human potentialities or possibilities. To the idealists this becomes the signal for a never-ending search for human possibilities, for the *summum bonum* is the totality of possibilities realized. As Mr. Buchanan says, "all the sciences are invited to contribute and each takes its place as a level or degree of possibility. Each is found wanting and partial, a one-sided ideal before it is realized and merely the condition for higher development when it is fulfilled."

The logical fallacy in this doctrine is the transformation of possibility into obligation, of "can be" into "ought to be." Mr. Buchanan does not say what is the proper basis for the ethical imperative, but as a theoretician of possibility he knows the expansive power of the realm of the possible, and, he says, in effect, this way lies madness.

It will be evident to the reader that Mr. Buchanan's contribution to the understanding of science is essentially critical—critical in the negative sense. He insists that discursive science is possibility, and that possibility is always tied up to actuality or concrete experience for its reference. In this wise he may be said to restate the pragmatic criticism of scientific intellectualism. Where the pragmatic philosopher speaks of the abstract character of science, Mr. Buchanan speaks of science as reflecting possibility. But whereas the pragmatic philosopher seems to believe that the problem of science is settled by this negative criticism, and that all that is necessary from then on is to apply science as a set of theoretical instrumentalities for the satisfaction of concrete social and biological ends; for Mr. Buchanan the negative criticism is only preliminary

to the metaphysical evaluation of science and possibility. Into this metaphysical domain he does not, in the present essay, choose to enter. At times it would seem that he prefers to convey his metaphysical ideas to the reader by having him read between the lines; at other times he plainly appears too much frightened by the bad metaphysics of Anglo-German idealism to venture on any of his own. But in any case he feels that the first thing that needs to be done is to destroy the dogmatic character of discursive science, and thus to make people realize that discursive science represents a problem, rather than a fixed solution.

All this has an intimate bearing upon the present-day cultural situation. Some day the history of modern science will be written with impartial detachment, and when it is so written it will reveal as much of a tragedy of lost opportunity, as keen a disappointment of intellectual expectations, as that which attends any political revolution. *Plus ça change, plus c'est la même chose!* The rule of Science as a vested interest has shown itself to be no more enlightened, no more intellectual, than the rule of Religion as a vested interest—in certain ways perhaps less so. And why has this been? the future historian will ask. Because the true nature of science was quickly overladen with the products of the image-worship of the abstract imagination which confounded formal concepts and visual metaphors with the concrete living reality.

The experience of the last three centuries should have abundantly demonstrated—even if we were to ignore the analytic criticisms of Kant—that physical science and the methods of physical science limit themselves to a fairly fixed frame of abstraction or formality. Natural science may in this respect be defined as the manipulation of spatial signs through the use of quantitative formulas. And, as it happens, this type of knowledge has shown itself to be quite satisfactory, as far as physical nature is concerned, because it represents about all we are interested in finding out in that quarter. We are not interested in the souls of stones, but only in how much weight they can support. But as we pass to biology, it becomes already apparent that there are more essential things which we would like to learn. For example, a knowledge of right living is in many ways more desirable than the skill or knowledge of the surgeon which permits him to remove disabled organs. And certainly as we enter the domain of the social and moral sciences, it becomes positively superstitious to concentrate upon the study of insignificant external properties, simply because they are mechanically more measureable, and neglect the possibilities of more intensive intellectual analysis.

Here, then, lies the tragedy of modern science, that in the name of knowledge, it has forsaken the intellectual method, and that in the

name of truth it has worshipped abstraction. This is the tragedy that Mr. Buchanan's essay invites the younger generation of philosophers to contemplate.

BENJAMIN GINZBURG.

NEW YORK CITY.

La Famiglia Cristiana. Settimane Sociali d'Italia, xiii sessione, 1926, Genova. Milano: Società Editrice "Vita e Pensiero." 1927. Pp. 332.

This work is a collection of essays written by different authors and exposing the Christian precepts about the family, as they have been handed down to us by the Roman Catholic Church. All aspects of the problem are treated at great length. A full chapter is devoted to the family property; another to the family dwelling.

The authors, who are professors in various Catholic Universities of Italy, are, as to be expected, highly eulogistic in their treatment of the Catholic doctrine. They study the question of divorce, admitted by Protestant Churches and by most modern legislators, and show that, far from being a boon to modern society, it has been a fruitful source of evils for the family. The authors have also very good pages dealing with our modern democratic governments in which the family is losing more and more every day the importance it possessed in former centuries. In the eyes of our modern legislators, the family does not exist. There exists the all-powerful State; and the individuals, who have become mere wheels of the mighty governmental machine, have lost almost entirely the individual liberty of former ages.

Although to many Protestants of this country, Catholic teaching may and does appear obsolete, a perusal of this work will show that it is on the whole sounder than many of the new doctrines which are too often a cause of unrest and dissatisfaction to modern society.

J. L. PERRIER.

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NOTES AND NEWS

The January-March, 1928, number of the *Revue de Littérature Comparée* is devoted to the United States. Among the articles of interest to philosophers are the following: "Franklin et Mirabeau collaborateurs" by B. Faÿ; "Niemcewicz en Amérique et sa correspondance inédite avec Jefferson (1797–1810)," by W. M. Kozlowski; "Chateaubriand et la littérature des États-Unis" by P. Hazard.